BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 08

2003 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

July 2003

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South Carolina Department of Health and Environmental Control

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2003 ANNUAL UPDATE

[Data Thru December 2002]

Shellfish Management Area 08
Shellfish Sanitation Program

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Data Inclusive Dates:
01 / 01 / 00 thru 12 / 31 / 02

Classification Change:
__ Yes X No

Shoreline Survey Completed: Yes

Prior Report & Date: Annual -2002

(I)ncreased/(D)ecreased/(N)one:
N Approved
N Cond. Approved
N Restricted
N Prohibited

SUMMARY

Water quality at all shellfish monitoring sites in Area 08 meets Approved area criteria. However, development continues to occur at a rapid pace along the upland shore of Area 08 and the potential for adverse impacts from nonpoint source pollution is significant.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47 that provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted, or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources,

and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria, consistent with the NSSP Model Ordinance and S. C. Regulation 61-47, are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution, e.g., wastewater treatment and collection systems, evaluation of each source of pollution, and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. For Restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one

hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

This sanitary survey evaluates the current harvesting classification of shellfish growing waters designated as Shellfish Management Area 08 (Area 08). Area 08 consists of approximately 26,693 acres of shellfish growing area habitat located in Charleston County, South Carolina. Area 08 extends approximately fourteen miles in a general northeasterly to southwesterly direction from Moore's Landing to the northern end of Gray Bay. The area consists of large water bodies such as Seewee Bay, Mark Bay, Copahee Sound, Hamlin Sound and the Atlantic Intracoastal Waterway (AIWW). Some of the smaller waters in Area 08 include: Anderson, Capers, Clauson, Dewees, Price, Toomer and Whiteside Creeks. The area is bounded to the northeast by an imaginary line extending between AIWW Marker #65 and the northeastern tip of Bull Island. US Highway 17 defines the northwestern border of the area. The southwestern boundary is an imaginary line extending from approximately one-quarter mile

south of the end of 41st Avenue, Isle of Palms through the northern end of Gray Bay. The southeastern boundary consists of the Atlantic Ocean shoreline of Bull, Capers and Dewees Islands and northern portions of the Isle of Palms.

The harvesting classifications of Area 08 prior to this sanitary survey were as follows:

Prohibited: (Administrative closures)

1. The AIWW, extending approximately 1900 feet north of the Forest Trail outfall to marker 116 (Station 10). This includes the Wild Dunes Yacht Harbor;
2. The AIWW, extending south from the Forest Trail Outfall to the Area 09A boundary;
3. The southern portion of Morgan Creek, from its confluence with the AIWW to its confluence with Cedar Creek.

Approved: All other waters in Area 08

The shellfish industry in South Carolina is based primarily on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams, which include both the northern clam (*Mercenaria mercenaria*) and several small populations of the southern clam (*Mercenaria campechiensis*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include State shellfish grounds, culture permits, and Kings Grant areas. The ribbed mussel, (*Geukensia demissa*), is also harvested in South Carolina on a small scale by the general public for recreational harvest. The South Carolina Department of Health and Environmental Control will disallow the harvesting of shellfish within Area 08, for direct marketing purposes, from the restricted waters listed below in the Recommendations.

There are numerous State shellfish Grounds and Culture Permit Areas within Area 08. There is also one recreational Shellfish Ground located adjacent to Seewee Bay. One King's Grant is located within Area 08

The shellfish harvest season in South Carolina normally extends from mid-September through mid-May. The SCDNR has the authority to alter the shellfish harvest season for resource management purposes and grant permits for year-round mariculture operations. Additionally, the South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

CHANGES IN POLLUTION SOURCES

One substantial change in potential pollution sources has occurred in Area 08 since the 2002 report. The Bulls Bay Golf Course has been built on the Area 08 upland between Toomer and Whiteside Creeks.

SURVEY PROCEDURES

Shoreline surveys of Area 08 were conducted by the Trident District Shellfish Sanitation staff, by watercraft, vehicle and on foot, during the survey period and are ongoing. Extensive visual examinations of lands adjacent to the waters of Area 08 were conducted to determine potential sources of pollution entering shellfish growing waters.

POINT SOURCE POLLUTION

National Pollutant Discharge Elimination System (NPDES) Permitted Facilities

Permit Number	Facility Name	Facility Type
SC0025283	IOP/Forest Trail SD	Municipal-Discharge
ND0062260	IOP/Wild Dunes Beach	Municipal-Land Application
ND0069329	Dewees Is./Dewees Dev. Corp.	County-No Discharge
SCG730102	Lowcountry Dirt/Schaffer Mine	Industrial-Discharge
SCG730226	Charleston CPW/Bean Pit	Industrial-Discharge

A. **Municipal and Community Waste Treatment Facilities** - There are three permitted wastewater facilities within Area 08. The first is the Forest Trail Wastewater Treatment Plant located on the Isle of Palms. The Forest Trail facility discharges treated effluent into the AIWW adjacent to 41st Avenue. The second facility, also located on the Isle of Palms, is the Wild Dunes Wastewater Treatment Plant. This plant does not have a direct discharge into shellfish waters. The facility utilizes extended aeration with a holding pond and the treated effluent is land applied to the golf course of the Wild Dunes Beach and Racquet Club. The other is the facility located on Dewees Island. This facility utilizes an approved designated tile field, and has no direct discharge into shellfish waters. A minimum 1000-foot closure exists around all wastewater outfalls to shellfish waters.

The Forest Trail Wastewater Treatment Plant did not exceed their permit levels in 2002. Permit limits established for fecal coliform for this facility are 14/43 MPN per 100 ml. According to Discharge Monitoring Reports (DMRs) submitted to the Department, the facility had no violations of the permit limits during 2002.

B. **Industrial Waste (Discharges)** - There are two permitted industrial wastewater discharges located within Area 08. Both permits were issued based on concerns associated with land clearing and borrow pit excavations. The first, Lowcountry Dirt, is located at the headwaters of Clauson Creek. The second, operated by Charleston CPW as a borrow pit, is located immediately north of Station 25. Groundwater and solids are permitted for discharge under a general mining permit. There are no hazardous bacteriological or chemical components.

Although these facts suggest no impact from these sources, discharge sites are shown on the Potential Pollution Sources map.

C. **Marinas** - S.C. Regulation 61-47, Shellfish defines *Marina* as "any water area with a structure (docks, basin, floating docks, etc.) which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space." Wild Dunes Yacht Harbor is a large recreational marina located in Morgan Creek on the Isle of Palms. The marina provides approximately 3000 feet of dockage. Sewage pump-out is provided and is available to the boating public. A 1000' Prohibited closure is in effect around the marina. There are no additional marinas within Area 08.

D. **Radionuclides** - Sources of radionuclides have not been identified within Area 08, and radionuclide monitoring has not been conducted. No other source of poisonous or deleterious substances has been identified within the area.

NONPOINT SOURCE POLLUTION

A. **Urban and Suburban Stormwater Runoff** - The shoreline survey conducted in Area 08 revealed the highest concentration of homes to be on the north end of the Isle of Palms and along the mainland shore from Awendaw to Mount Pleasant. Single family homes continue to be built along the mainland shore from Copahee Sound to Seewee Bay. Two separate housing developments have been built adjacent to Hamlin Sound. Several new homes have been noted along the AIWW near Moore's Landing. Bulls Bay golf Course has been built and is in operation. Stormwater runoff from the Isle of Palms has the potential to impact these areas.

Currently there are 2 stormwater permits that have been issued within Area 08. All of the permits are concentrated in the area of Copahee Sound. One permit is for a small industrial park located on U.S. Highway 17 and another is for the KOA Campground also on U.S. Highway 17. The potential area of impact would be Hamlin Sound (stations 2 and 17). Several dredge spoil areas are located along the AIWW; however, the Army Corps of Engineers did not conduct any dredging projects within Area 08 during this past survey period.

The uplands surrounding the shellfish growing waters of Area 08 consist of various soil textures. These have been defined by the United States Department of Agriculture (USDA), Soil Conservation Service (1971) utilizing general classifications and descriptions. Although lands within Area 08 consist of numerous soil types, the area is generally comprised of Rutlege-Scranton-Pamlico soils, made up of low, broad flats and long, nearly level, sandy ridges. The USDA (1971) further describes these soils as "somewhat poorly drained to very poorly drained, nearly level to depressional, sandy and mucky soils."

B. **Agricultural Runoff** - There are no permitted agricultural facilities located in Area 08, however, there is a horse farm located one-half mile from U. S. Highway 17 on the south side of Seewee Road. This farm is adjacent to Clauson Creek, directly north of station 21. An

unnamed creek and its tributary system, north of Clauson Creek along the AIWW, may also receive stormwater runoff from the farm. Additionally, several tracts of land between U.S. Highway 17 and the AIWW are used as crop farm land. An additional tract, north of Whiteside Creek and adjacent to U.S. Highway 17, is used as a plant nursery.

C. Individual Sewage Treatment and Disposal Systems - New home construction has been observed along the mainland of Mount Pleasant and Awendaw as well as the northern end of Goat Island. Mount Pleasant Waterworks has reported that the homes in the Seewee Road area are on individual septic systems. This area is adjacent to stations 9, 21 and 25. They also report that the homes from Hamlin Road to the southern boundary of the area remain on individual septic systems. All homes within this area utilize individual sewage treatment disposal (ISTD) systems. The Division of Environmental Health, Trident Health District, requires an inspection and approval of each system prior to final installation.

D. Wildlife and Domestic Animals - Area 08 supports substantial populations of both wildlife and domestic animals. Bull, Capers and Dewees Islands are the three barrier islands within the area. The barrier islands contain such wildlife as beaver, rabbit, white-tailed deer, raccoon, opossum, various rodents, and bird populations typical of the coastal Carolinas. The entire area has an extensive network of small tidal creeks. This creek system provides a possible conduit for animal fecal coliform bacteria to be transported to the adjacent shellfish growing waters.

E. Boat Traffic - Boat traffic is moderate throughout the area throughout the year. Shrimp baiting season, which typically begins in September and ends in November, contributes to moderate levels of recreational boat traffic throughout the area. Commercial traffic in the AIWW consists primarily of tugs and barges and is consistent throughout the year. Commercial fisheries boats, ranging in size from 16 to 50 feet, operate at frequencies consistent with product demand.

F. Hydrographic and Habitat Modification - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval. Portions of the AIWW require maintenance dredging. The U.S. Army Corps of Engineers utilizes designated tracts of land adjacent to the AIWW as dredge spoil sites.

G. Marine Biotoxins - Bivalve shellfish contamination from marine biotoxins has not been shown to be a human health concern within Area 08. The Department participates in a State Task Force on Toxic Algae and maintains a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 08 is comprised of several large, shallow bays and numerous deep-water creeks. The creeks within the area range from 40 to 900 feet in width and average 9 to 30 feet in depth. Additionally, the AIWW traverses the area's entire length in a north-south direction. The AIWW is maintained at a mean low water depth of 12 feet by the US Army Corps of Engineers. The major conduits of water flowing into and out of the area are Capers Inlet, Dewees Inlet, Prices Inlet and Bull Harbor. The influence of high-salinity ocean water, entering the area by way of these inlets, provides high flow and a subsequent flushing action that assists in maintaining high water quality. The entire area is approximately five miles wide (northwest to southeast) and sixteen miles long (southwest to northeast).

Tides - Tides in Area 08 are semidiurnal, consisting of two low and two high tides occurring each lunar day. Mean tidal ranges in the center of the area along Capers Island are 5.0 feet during normal tides and 6.5 feet during spring tides. Wind direction and intensity, as well as atmospheric pressure, typically cause variations in predicted tidal ranges.

Rainfall - Precipitation in Area 08 is heaviest during late summer and early autumn. Tropical storms and hurricanes occasionally produce extremely large amounts of rainfall. During winter months heavy rainfall events are uncommon, yet occasional intense thunderstorms associated with rapidly moving low-pressure systems generate heavy rains. Precipitation rarely occurs in the form of snow or ice. Spring weather patterns may be dynamic with associated thunderstorms and severe weather conditions.

The thirty-year average for rainfall in Charleston, recorded at the Charleston Airport, is 50.74 inches. The 2002 precipitation total recorded in Mount Pleasant was 76.9 inches. The four months, July through October, had a total of 35.0 inches of rain. This was 46% of the total rainfall recorded for the year.

Winds - Prevailing winds along the central portion of the South Carolina coast are from the south and west during spring and summer and from the north during autumn and winter. Wind speeds are generally less than 15 miles per hour (mph); however, strong weather systems may generate winds in excess of 25 mph. Tropical storms and hurricanes occur occasionally.

River Discharges - Freshwater rivers do not discharge directly into Area 08. Freshwater influence is primarily due to localized rainfall.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 08 in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review

period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July 1998, an updated shellfish water quality data scheduling and collection procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station, yet provides a six-sample 'cushion' (above the NSSP required 30 minimum) for broken sample bottles, lab error, breakdowns, etc. This also allows each annual report's water quality data to meet the requirements for the NSSP Triennial Review sampling criteria.

Seven hundred and fifty-six SRS surface water quality samples (<1.0 ft. deep) were collected for bacteriological analyses and classification purposes from twenty-one active water quality sampling stations in Area 07 during the period 01/01/00 through 12/31/02. The samples were collected in 120 ml amber glass bottles, immediately placed on ice and transported to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. At the laboratory, sample sets exceeding a 30-hour holding time or containing a temperature control in excess of 10 degrees C. were discarded (APHA, 1970).

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using an automatic temperature compensated refractometer. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined by using Nautical Software's *Tides & Currents*, Version 2 (1996).

MONITORING RESULTS

No station exceeded a fecal coliform geometric mean MPN value of 14 and no station exceeded a fecal coliform MPN estimated 90th percentile value of 43.

A Fecal Coliform Bacteriological Data Summary Table is included in this report (see Table 2). Fecal coliform bacteriological raw data collected between 01/01/00 and 12/31/02 are included following the data summary table.

CONCLUSIONS

Based on the review of fecal coliform bacteriological data and the pollution source survey, Area 08 appears to be minimally impacted by one type of pollution .

NONPOINT SOURCE RUNOFF

Although Area 08 in it's entirety demonstrates water quality meeting Approved area criteria, stormwater runoff appears to be a source of minimal fecal coliform bacteria levels in the area of Cedar and Morgan Creeks at the northern end of the Isle of Palms. The large animal populations on Bull, Capers and Dewees Islands do not appear to be a significant problem- probably due to significant ocean water flushing in and around the islands and neighboring creeks. The shellfish water quality stations along the upland, from Mount Pleasant to Awendaw, are being closely monitored. To date, the increased sporadic development along this section of land does not appear to have adversely affected the water quality within the shellfish growing area.

RECOMMENDATIONS

The shoreline survey and the bacteriological data review of shellfish growing Area 08 indicate that the classification boundary descriptions are appropriate The harvesting classification of Area 08 for this sanitary survey will be as follows:

Prohibited: (Administrative closure)

1. The AIWW, extending approximately 1900 feet north of the Forest Trail outfall to marker 116 (Station 10). This includes the Wild Dunes Yacht Harbor;
2. The AIWW, extending south from the Forest Trail Outfall to the Area 09A boundary;
3. The southern portion of Morgan Creek, from its confluence with the AIWW to its confluence with Cedar Creek.

Approved: All other waters in Area 08.

Station Additions/Deactivations/Modifications: None

Analysis of sampling data for Area 08 demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24-hour period. Therefore, a precautionary closure of Area 08 will be implemented following rainfall events of greater than 4.00" in a 24 hour period, as measured at the Mount Pleasant Waterworks, Rifle Range Road facility located in Mount Pleasant. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States has been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (*National Weather Service*). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52, and 53 (*National Research Council, 1985*).

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TABLE #1
Shellfish Management Area 08
Water Quality Sampling Stations Description

Station	Description
01	Morgan Creek at northernmost confluence with AIWW – adja't to Mrkr #115
02	Hamlin Sound
03	Dewees Inlet at AIWW - North of Marker #110
04	Bull Yard Sound - Marker #104
05	Whiteside Creek - Marker #96
06	Mark Bay - Marker #90
07	Price's Inlet
09	Moore's Landing Dock - At Marker #74
10	Marker #116 north of Isle of Palms STP outfall in AIWW
13	Seewee Bay POG - Seewee Bay at Hickory Bay
14	Dewees Island - 1/4 mile up Horsebend Creek
15	Dewees Island - Mouth of Watermelon Creek
16	Confluence of Seven Reaches and Gray Bay
17	S.W. Copahee Sound at Porchers Bluff Creek
18	One-half mile up Cedar Creek from Dewees Inlet
19	Confluence of Toomer Creek at Copahee Sound
20	Upper reaches Whiteside Creek
21	Upper reaches Clauson Creek
22	Confluence of Capers Creek and Santee Pass
24	Anderson Creek at main fork above confluence with Bulls Bay
25	Palmetto Point Creek (adjacent to Marker #84)\

(Total 21)

Figure 1.

Shellfish Management Area 08 Prior Classification

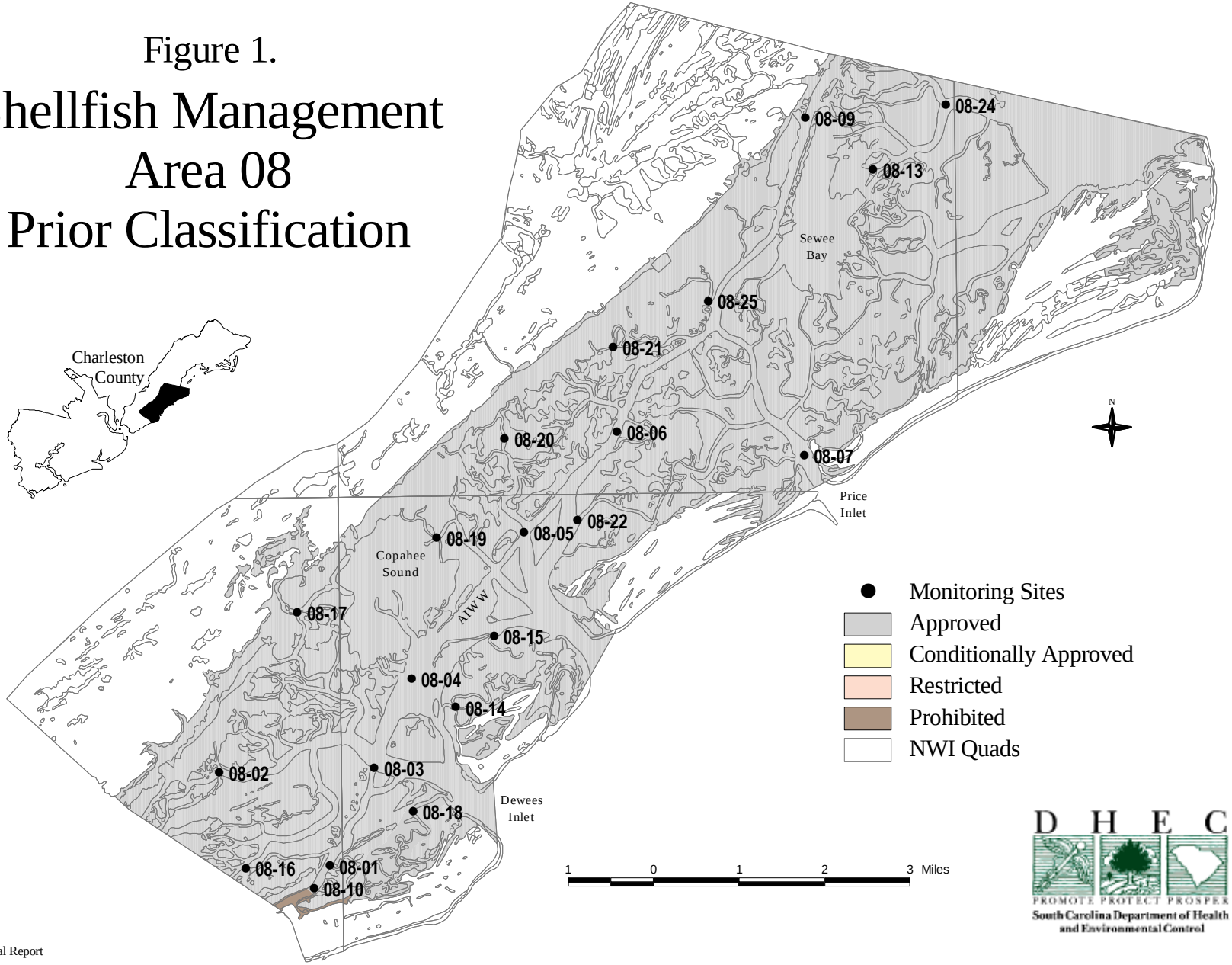

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Figure 2.

Shellfish Management Area 08 Current Classification

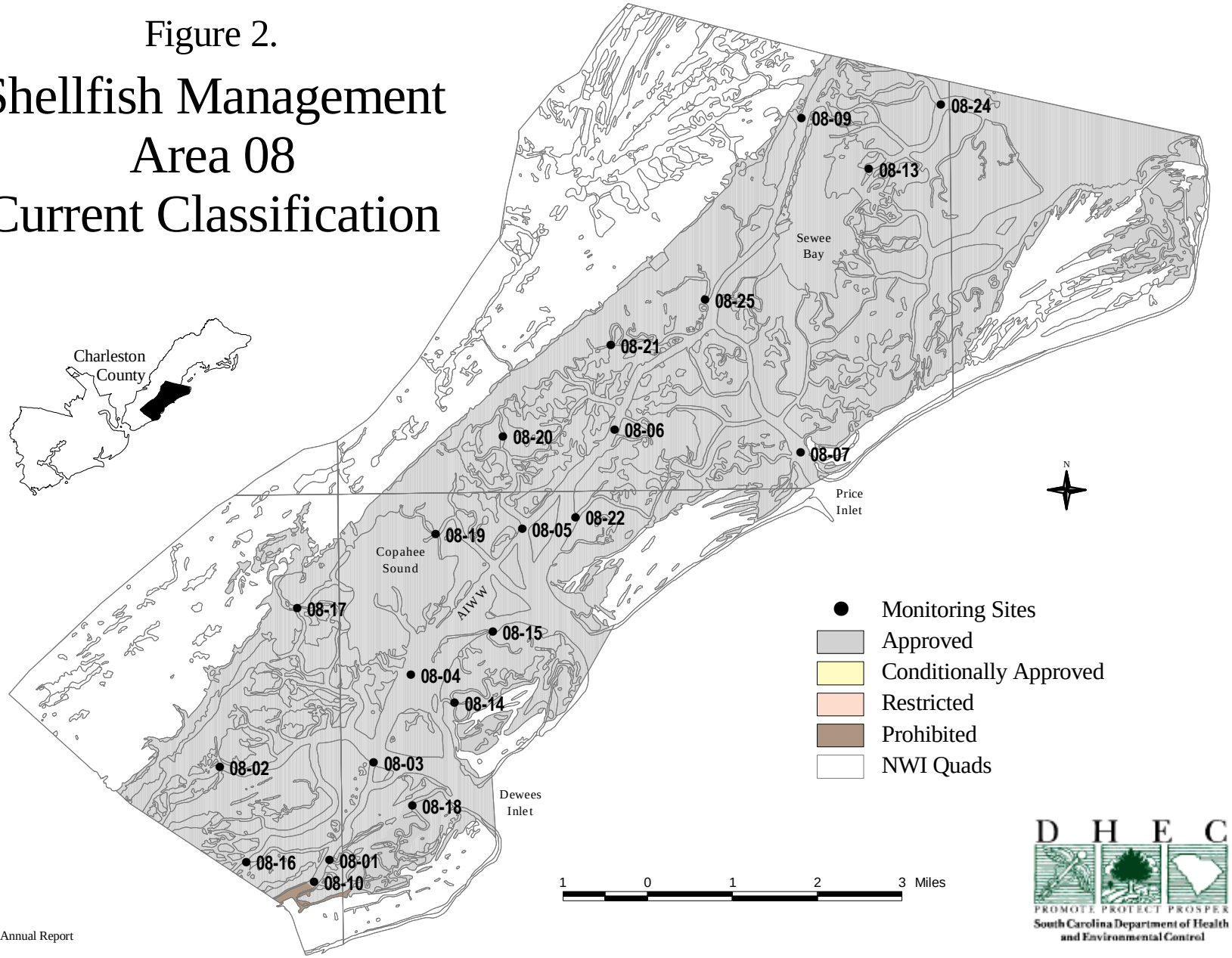

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Figure 3.

Shellfish Management Area 08

Potential Pollution Sources

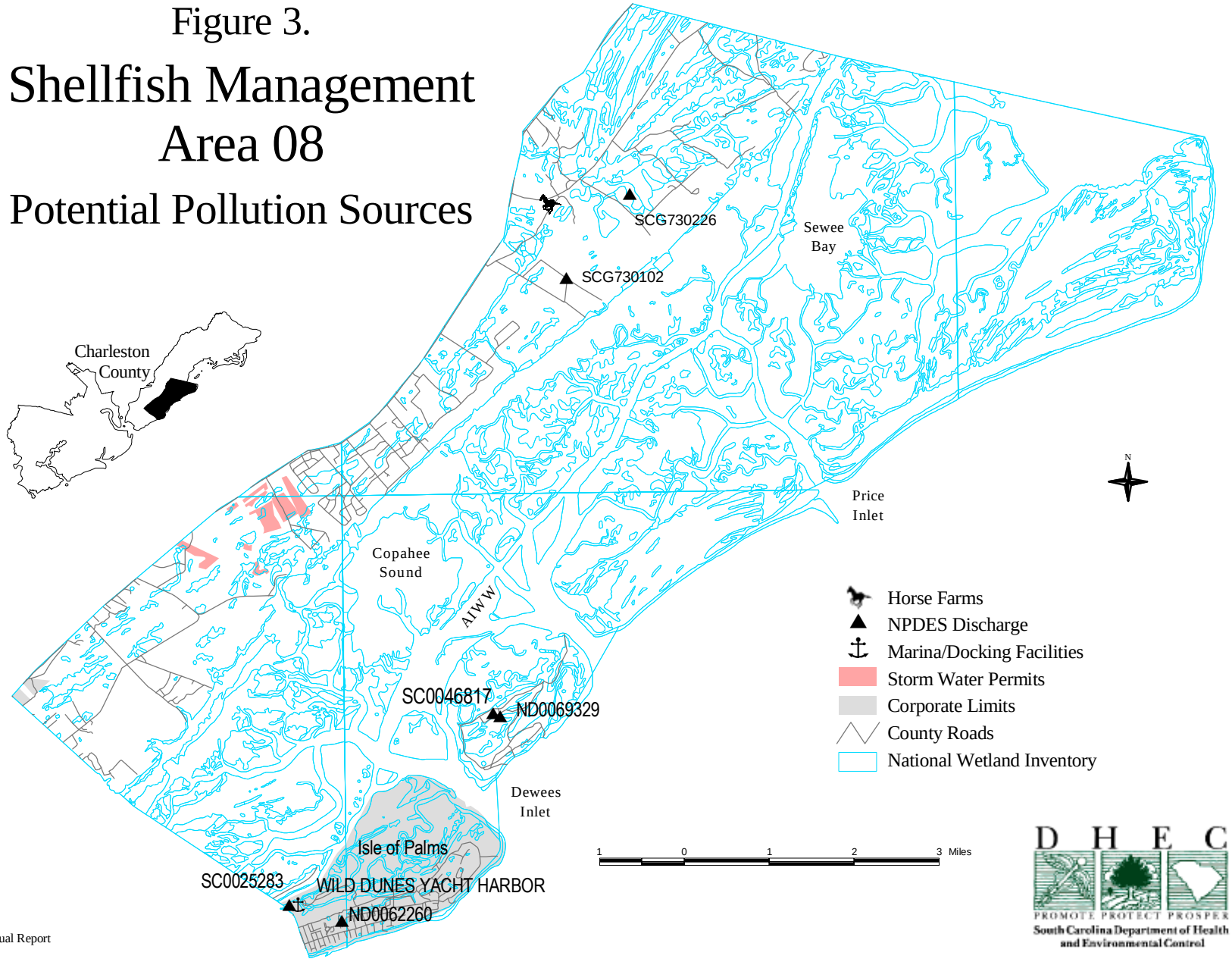

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TABLE #2
Shellfish Management Area 08

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
from Shellfish Water Quality Sampling Stations between

January 1, 2000 and December 31, 2002

Station #	1	2	3	4	5	6	7	9	10	13
Samples	36	36	36	36	36	36	36	36	36	36
GeoMean	7.9	2.3	2.4	2.7	2.8	3.1	2.9	3.2	6.4	2.0
90th %ile	41	4	5	6	7	8	7	11	31	2
WATER QLTY	A	A	A	A	A	A	A	A	A	A
Classification	A	A	A	A	A	A	A	A	P	A

Station #	14	15	16	17	18	19	20	21	22	24
Samples	36	36	36	36	36	36	36	36	36	36
GeoMean	6.7	2.5	2.7	4.0	8.7	3.2	3.7	4.3	3.9	2.2
90th %ile	30	5	8	28	42	13	13	19	13	3
Water Qlty	A	A	A	A	A	A	A	A	A	A
Classification	A	A	A	A	A	A	A	A	A	A

Station #	25									
Samples	36									
GeoMean	3.9									
90th %ile	11									
Water Qlty	A									
Classification	A									

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** – Prohibited

TABLE #3

Water Quality
Sampling Stations Data

Shellfish Management Area 08

BACTERIOLOGICAL DATA

Data for each shellfish station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained through South Carolina's Department of Health and Environmental Control - Freedom of Information office at the address below.

Freedom of Information
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

TABLE #4

Rainfall Data

Shellfish Management Area 08

SOURCE:
Rainfall information provided by
Mount Pleasant Waterworks & Sewer Commission
Mount Pleasant, South Carolina.
[*Rifle Range Road rainfall recording station]*

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2000	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1									1.00			
2								0.40	1.50			0.10
3			0.30						0.90			
4			0.40			0.50		0.80	1.20		0.10	
5									1.20			
6	0.10						0.20					
7	0.20						0.30		0.40			
8				0.30								
9												0.80
10	0.30											
11								3.30				
12							1.30					
13		0.70					1.10	0.50				
14		1.10		0.50			0.10					0.10
15												
16			0.70									
17				0.30					4.10			
18								1.30	0.10		0.40	
19	0.20		0.20								0.90	
20	0.30		1.50						0.10			
21									0.10			
22									0.50			
23	0.30						0.30	0.10				
24	1.00			0.30			1.10	0.30			0.30	
25							0.30				0.90	
26												
27			0.30					0.40				
28	0.20							0.30				1.00
29	0.50			0.20		1.20	1.90	0.50				
30	0.30		0.20				1.50					
31							0.20					

(Monthly Figures) **Year's Rainfall Total:** **44.00**

SUM	3.40	1.80	3.60	1.60	0.00	1.70	8.30	7.90	11.10	0.00	2.60	2.00
MAX	1.00	1.10	1.50	0.50	0.00	1.20	1.90	3.30	4.10	0.00	0.90	1.00
MIN	0.10	0.70	0.20	0.20	0.00	0.50	0.10	0.10	0.10	0.00	0.10	0.10
AVG	0.34	0.90	0.51	0.32	0.00	0.85	0.75	0.79	1.01	0.00	0.52	0.50

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2001	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1						1.00	0.80					
2							1.80		1.50			
3		0.10	0.30						0.20			
4		0.20					0.30		1.50			
5								0.90				
6										0.20		
7						0.50			0.30			
8	0.30											
9						1.40			0.20			
10												2.50
11		0.50							0.10			
12	0.50	0.40	0.70				1.80					0.05
13		0.10		0.10		0.40		1.60				0.20
14			0.20			0.30		0.20	0.10	0.40		
15			1.30									
16												
17												
18								0.80				
19								0.60				
20			2.10			0.90	3.10	1.20		0.30		
21		0.60				0.10						
22	0.20				0.70		0.30					
23							0.60				0.60	
24									0.30		0.50	
25			0.20	0.40								
26					0.50		0.20					
27		0.10					5.00					
28			0.30		1.30		0.70					
29			0.30		0.30		0.30					
30	0.10						0.10					
31												

(Monthly Figures) **Year's Rainfall Total:** **45.65**

SUM	1.10	2.00	5.40	0.50	2.80	4.60	15.00	5.30	4.20	0.90	1.10	2.75
MAX	0.50	0.60	2.10	0.40	1.30	1.40	5.00	1.60	1.50	0.40	0.60	2.50
MIN	0.10	0.10	0.20	0.10	0.30	0.10	0.10	0.20	0.10	0.20	0.50	0.05
AVG	0.28	0.29	0.68	0.25	0.70	0.66	1.25	0.88	0.53	0.30	0.55	0.92

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2002	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.90	0.10			0.10	0.50			
2			0.10					0.10				
3	0.20		2.50						0.50			
4			0.10		0.40							
5					0.20		0.20				0.30	
6	0.20						0.30	0.20	0.10		1.60	0.30
7	0.50	1.60					1.00	0.20			0.20	
8		0.40				0.10				1.00		
9			0.20				0.30			3.50		
10		0.50		0.20						0.30		1.00
11		0.30		2.10						1.20	1.50	0.30
12				0.10						0.90	0.90	
13	1.00		0.50				0.50				1.70	1.00
14					0.70					0.70		
15	0.50					0.30	1.30	0.10		1.30		
16		0.10							0.60	0.30		
17											1.00	
18								0.20			0.20	
19					1.00	3.50						0.20
20					0.20	0.10						0.70
21		0.50				2.00						
22			0.70			1.30	0.10	0.20		0.30		
23		0.10				4.50	3.50					
24							0.10					
25								0.40	0.10	0.10		1.80
26	0.20							0.30	4.80			
27			0.30					1.00	0.40			
28				0.10				1.50				
29								0.90		0.40		
30								3.80		0.20		
31			0.90					1.50				

(Monthly Figures) **Year's Rainfall Total: 76.90**

SUM	2.60	3.50	5.30	3.40	2.60	11.80	7.30	10.50	7.00	10.20	7.40	5.30
MAX	1.00	1.60	2.50	2.10	1.00	4.50	3.50	3.80	4.80	3.50	1.70	1.80
MIN	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20
AVG	0.43	0.50	0.66	0.68	0.43	1.69	0.81	0.75	1.00	0.85	0.93	0.76

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)